WEST

Help | Logout | Interrupt

Main Menu | Search Form | Posting Counts | Show S Numbers | Edit S Numbers | Preferences | Cases

Search Results -

Terms	Documents
13 and L4	15

US Patents Full-Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
Database: IBM Technical Disclosure Bulletins

Search: L5

Refine Search

Recall Text | Clear

Search History

DATE: Wednesday, May 14, 2003 Printable Copy Create Case

Set Name side by side	**Query**	**Hit Count**	**Set Name** result set
	DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ		
L5	13 and L4	15	L5
L4	agrochemical$1 or agrichemical$1 or pesticid$ or herbicid$ or insecticid$ or fungicid$	176799	L4
L3	11 and L2	48	L3
L2	kenaf	887	L2
L1	oil$1 near5 (absor$7 or adsor$7)	33604	L1

END OF SEARCH HISTORY

WEST

Generate Collection | Print

Search Results - Record(s) 1 through 10 of 15 returned.

☐ 1. Document ID: US 20030032702 A1

L5: Entry 1 of 15 File: PGPB Feb 13, 2003

PGPUB-DOCUMENT-NUMBER: 20030032702
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030032702 A1

TITLE: Compositions and composites of cellulosic and lignocellulosic materials and resins, and methods of making the same

PUBLICATION-DATE: February 13, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Medoff, Marshall	Brookline	MA	US	
Lagace, Arthur P.	Newtonville	MA	US	

US-CL-CURRENT: 524/13; 524/14

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 2. Document ID: US 20020155955 A1

L5: Entry 2 of 15 File: PGPB Oct 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020155955
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020155955 A1

TITLE: Solid agricultural chemicals composition, preparation thereof and the method for scattering the same

PUBLICATION-DATE: October 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kato, Susumu	Shizuoka-shi		JP	
Okawa, Tetsuo	Shimizu-shi		JP	
Fujita, Shigeki	Iwata-shi		JP	
Maeda, Yoshihiro	Haibara-gun		JP	

US-CL-CURRENT: 504/367

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☑ 3. Document ID: US 20020010229 A1

L5: Entry 3 of 15 File: PGPB Jan 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020010229
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020010229 A1

TITLE: Cellulosic and lignocellulosic materials and compositions and composites made therefrom

PUBLICATION-DATE: January 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Medoff, Marshall	Brookline	MA	US	
Lagace, Arthur P.	Newtonville	MA	US	

US-CL-CURRENT: 523/129

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☑ 4. Document ID: US 6436288 B1

L5: Entry 4 of 15 File: USPT Aug 20, 2002

US-PAT-NO: 6436288
DOCUMENT-IDENTIFIER: US 6436288 B1

TITLE: Bast medium biological reactor treatment system for remediation and odor suppression of organic waste streams

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Burcham; Timothy N.	Mississippi State	MS		
Jones; Jeffrey	Mississippi State	MS		
Columbus; Eugene P.	Mississippi State	MS		
Zappi; Mark E.	Mississippi State	MS		

US-CL-CURRENT: 210/602; 210/505, 210/605, 210/615, 210/630, 210/916

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 5. Document ID: US 6312828 B1

L5: Entry 5 of 15 File: USPT Nov 6, 2001

US-PAT-NO: 6312828

DOCUMENT-IDENTIFIER: US 6312828 B1

TITLE: Packaging material for photographic photosensitive material

DATE-ISSUED: November 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Akao; Mutsuo	Kanagawa			JP

US-CL-CURRENT: 428/516; 428/35.2, 524/395, 524/424, 524/450, 526/348, 526/943

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 6. Document ID: US 6270893 B1

L5: Entry 6 of 15 File: USPT Aug 7, 2001

US-PAT-NO: 6270893
DOCUMENT-IDENTIFIER: US 6270893 B1

TITLE: Coated fiber product with adhered super absorbent particles

DATE-ISSUED: August 7, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Puyallup	WA		
Neogi; Amar N.	Seattle	WA		
Hansen; Michael R.	Everett	WA		

US-CL-CURRENT: 428/372; 428/359, 428/373, 428/375, 428/393, 442/330, 442/333, 442/59

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☑ 7. Document ID: US 6207729 B1

L5: Entry 7 of 15 File: USPT Mar 27, 2001

US-PAT-NO: 6207729
DOCUMENT-IDENTIFIER: US 6207729 B1

TITLE: Texturized cellulosic and lignocellulosic materials and compositions and composites made therefrom

DATE-ISSUED: March 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Medoff; Marshall	Brookline	MA		
Lagace; Arthur	Newtonville	MA		

US-CL-CURRENT: 523/129; 111/200, 424/405, 424/411, 424/413, 424/414, 424/94.1, 426/5, 428/364, 428/374, 47/31, 47/65.5, 524/13, 524/14, 524/76

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☑ 8. Document ID: US 5970582 A

L5: Entry 8 of 15 File: USPT Oct 26, 1999

US-PAT-NO: 5970582
DOCUMENT-IDENTIFIER: US 5970582 A

TITLE: Method for separating kenaf into core and fiber

DATE-ISSUED: October 26, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Stover; Jimmy R.	Corpus Christi	TX	78413	

US-CL-CURRENT: 19/5R; 19/24, 19/33, 241/13, 241/159, 241/7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 9. Document ID: US 5865824 A

L5: Entry 9 of 15 File: USPT Feb 2, 1999

US-PAT-NO: 5865824
DOCUMENT-IDENTIFIER: US 5865824 A

TITLE: Self-texturing absorbent structures and absorbent articles made therefrom

DATE-ISSUED: February 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chen; Fung-jou	Appleton	WI	54915	
Lindsay; Jeffrey Dean	Appleton	WI	54915	

US-CL-CURRENT: 604/378; 604/384, 604/385.12

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 10. Document ID: US 5516585 A

L5: Entry 10 of 15 File: USPT May 14, 1996

US-PAT-NO: 5516585
DOCUMENT-IDENTIFIER: US 5516585 A

TITLE: Coated fiber product with adhered super absorbent particles

DATE-ISSUED: May 14, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Puyallup	WA		
Neogi; Amar N.	Seattle	WA		
Hansen; Michael R.	Everett	WA		

US-CL-CURRENT: 428/372; 428/357, 428/361, 428/373, 428/375, 428/378, 428/393, 442/330

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments   KWIC
Draw Desc | Image

Generate Collection Print

Terms	Documents
l3 and L4	15

Display Format: - Change Format

Previous Page Next Page

WEST

Generate Collection | Print

Search Results - Record(s) 11 through 15 of 15 returned.

☐ 11. Document ID: US 5498478 A

L5: Entry 11 of 15 File: USPT Mar 12, 1996

US-PAT-NO: 5498478
DOCUMENT-IDENTIFIER: US 5498478 A
**** See image for Certificate of Correction ****

TITLE: Polyethylene glycol as a binder material for fibers

DATE-ISSUED: March 12, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hansen; Michael R.	Seattle	WA		
Park; David W.	Puyallup	WA		

US-CL-CURRENT: 428/372; 428/357, 428/359, 428/375, 428/393, 442/417

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

---

☐ 12. Document ID: US 5432000 A

L5: Entry 12 of 15 File: USPT Jul 11, 1995

US-PAT-NO: 5432000
DOCUMENT-IDENTIFIER: US 5432000 A

TITLE: Binder coated discontinuous fibers with adhered particulate materials

DATE-ISSUED: July 11, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Federal Way	WA		
Neogi; Amar N.	Seattle	WA		
Hansen; Michael R.	Seattle	WA		
Hodgson; Kevin T.	Seattle	WA		
Halabisky; Donald D.	Tacoma	WA		
Marsh; David G.	Federal Way	WA		
Brunnenkant; Christel	Seattle	WA		
Park; David W.	Puyallup	WA		
Gaddis; Paul G.	Renton	WA		
Johnston, Jr.; William C.	Puyallup	WA		

US-CL-CURRENT: 428/372; 428/357, 428/361, 428/373, 428/375, 428/378, 428/393

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC
Draw Desc | Image

☐ 13. Document ID: US 5230959 A

L5: Entry 13 of 15 File: USPT Jul 27, 1993

US-PAT-NO: 5230959
DOCUMENT-IDENTIFIER: US 5230959 A

TITLE: Coated fiber product with adhered super absorbent particles

DATE-ISSUED: July 27, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Puyallup	WA		
Neogi; Amar N.	Seattle	WA		
Hansen; Michael R.	Everett	WA		

US-CL-CURRENT: 428/372; 428/359, 428/361, 428/373, 428/375, 428/378, 428/393

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC
Draw Desc | Image

☐ 14. Document ID: US 5064689 A

L5: Entry 14 of 15 File: USPT Nov 12, 1991

US-PAT-NO: 5064689
DOCUMENT-IDENTIFIER: US 5064689 A

TITLE: Method of treating discontinuous fibers

DATE-ISSUED: November 12, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Puyallup	WA		
Neogi; Amar N.	Seattle	WA		
Brunnenkant; Christel	Seattle	WA		
Lincoln; James F. L.	Kent	WA		
Hansen; Michael R.	Everett	WA		

US-CL-CURRENT: 427/202; 156/62.2, 264/121, 264/122, 264/123, 425/83.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☑ 15. Document ID: US 5057166 A

L5: Entry 15 of 15 File: USPT Oct 15, 1991

US-PAT-NO: 5057166
DOCUMENT-IDENTIFIER: US 5057166 A

TITLE: Method of treating discontinuous fibers

DATE-ISSUED: October 15, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Young, Sr.; Richard H.	Puyallup	WA		
Neogi; Amar N.	Seattle	WA		
Brunnenkant; Christel	Seattle	WA		
Lincoln; James F. L.	Kent	WA		
Hansen; Michael R.	Everett	WA		

US-CL-CURRENT: 156/62.2; 156/166, 156/181, 156/62.6, 19/305, 264/121, 425/80.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

Generate Collection | Print

Terms	Documents
l3 and L4	15

Display Format: - Change Format

Previous Page Next Page

WEST

Generate Collection Print

L5: Entry 3 of 15 File: PGPB Jan 24, 2002

DOCUMENT-IDENTIFIER: US 20020010229 A1
TITLE: Cellulosic and lignocellulosic materials and compositions and composites made therefrom

Summary of Invention Paragraph (9):
[0008] Compositions that include the texturized fibrous materials described above, together with a chemical or chemical formulation (e.g., a pharmaceutical such as an antibiotic or contraceptive, optionally with an excipient; an agricultural compound such as a fertilizer, herbicide, or pesticide; or a formulation that includes enzymes) are also within the scope of the invention, as are compositions that include the texturized fibrous materials and other liquid or solid ingredients (e.g., particulate, powdered, or granulated solids such as plant seed, foodstuffs, or bacteria).

Detail Description Paragraph (2):
[0022] Examples of cellulosic raw materials include paper and paper products such as newsprint, poly-coated paper, and effluent from paper manufacture; examples of lignocellulosic raw materials include wood, wood fibers, and wood-related materials, as well as materials derived from kenaf, grasses, rice hulls, bagasse, cotton, jute, other stem plants (e.g., hemp, flax, bamboo; both bast and core fibers), leaf plants (e.g., sisal, abaca), and agricultural fibers (e.g., cereal straw, corn cobs, rice hulls, and coconut hair). Aside from virgin raw materials, post-consumer, industrial (e.g., offal), and processing waste (e.g., effluent) can also be used as fiber sources.

Detail Description Paragraph (10):
[0030] Texturized fibrous materials and compositions and composites of such fibers with other chemicals and chemical formulations can be prepared to take advantage of the material's properties. The materials can be used to absorb chemicals, for example, potentially absorbing many times their own weight. Thus, the materials could, for instance, be used to absorb spilled oil, or for clean-up of environmental pollution, for example, in water, in the air, or on land. Similarly, the material's absorbent properties, together with its biodegradability, also make them useful for delivery of chemicals or chemical formulations. For example, the materials can be treated with solutions of enzymes or pharmaceuticals such as antibiotics, nutrients, or contraceptives, and any necessary excipients, for drug delivery (e.g., for treatment of humans or animals, or for use as or in animal feed and/or bedding), as well as with solutions of fertilizers, herbicides, or pesticides. The materials can optionally be chemically treated to enhance a specific absorption property. For example, the materials can be treated with silanes to render them lipophilic.

Detail Description Paragraph (11):
[0031] Compositions including texturized materials combined with liquids or particulate, powdered, or granulated solids can also be prepared. For example, texturized materials can be blended with seeds (i.e., with or without treatment with a solution of fertilizer, pesticides, etc.), foodstuffs, or bacteria (e.g., bacteria that digest toxins). The ratio of fibrous materials to the other components of the compositions will depend on the nature of the components and readily be adjusted for a specific product application.

Detail Description Paragraph (24):
[0044] For example, a composition containing 90% by weight texturized cellulosic or

lignocellulosic material and 10% by weight ammonium phosphate or sodium bicarbonate can be prepared in a cone blender to create a fire-retardant material for absorbing oil.

Detail Description Table CWU (5):
5 Composition No. 3 Ingredient Amount (g) HDPE.sup.1 160 Fiber paper.sup.2 216 3.1 mm texturized kenaf 24 Coupling agent.sup.3 8

CLAIMS:

5. The composite of claim 1, wherein the fiber is kenaf.

WEST

Generate Collection | Print

L5: Entry 4 of 15 File: USPT Aug 20, 2002

DOCUMENT-IDENTIFIER: US 6436288 B1
TITLE: Bast medium biological reactor treatment system for remediation and odor suppression of organic waste streams

Drawing Description Text (4):
FIG. 3 is a photograph of chopped whole-stalk kenaf.

Drawing Description Text (5):
FIG. 4 is photograph of kenaf core (left), stalk (center), and bast fiber (right).

Drawing Description Text (6):
FIG. 5 is a graphical illustration of 190 L/hr BOD.sub.5 and COD values for kenaf and bioring reactors over time.

Drawing Description Text (7):
FIG. 6 is a graphical illustration of 57 L/hr BOD.sub.5 and COD values for kenaf and bioring reactors over time.

Drawing Description Text (9):
FIG. 8 is a graphical illustration of the total solids data versus time for kenaf and bioring reactors.

Drawing Description Text (10):
FIG. 9 is a graphical illustration of the volatile solids data versus time for kenaf and bioring reactors.

Drawing Description Text (14):
FIG. 13 is a graphical illustration of ammonium vs. time for kenaf and bioring mediums (15 and 50 gph).

Drawing Description Text (15):
FIG. 14 is a graphical illustration of COD vs. time for kenaf, bioring, and anaerobic pit mediums (15 and 50 gph).

Detailed Description Text (3):
The terms bast medium and kenaf medium as used herein refer to chopped whole-stalk kenaf (hibiscus cannabis) that contains both bast and core fibers. (See FIG. 3). The bast fibers are composed of phloem bundles and have been used extensively in cordage, paper, and biodegradable grass mats. The core, or woody fibers, have been utilized in animal bedding and soil-less potting media. The core, shown on the left in FIG. 4, is a foam-like structure that has been used for the production of paper, animal bedding (absorbent) animal forage, chicken house litter, particle board (acoustic tiles), oil-absorbent materials (e.g., for oil spill cleanup), and potting soil.

Detailed Description Text (4):
Bast producing plants such as kenaf have many unique characteristics that make it ideally suited as a biological treatment medium. To begin with, bast producing plants have rapid growth and a high yield. For example, kenaf grows to a height of from 12-18 feet (3.66-5.49 m) in only 150 days and annually yields 5-10 tons (4.54-9.07 t)of dry fiber per acre. Additionally, bast fibers provide a high surface area for aerobic treatment and microbial attachment. Further, the bast core material

accentuates the absorption of water and oil-based odor compounds. The core also provides micro-environments (10 micron tubules xylem vessels) suitable for anaerobic flora, thus providing a mechanism for anaerobic denitrification. Finally, most bast producing plants, such as kenaf, are relatively easy to grow, are drought tolerant, and require minimal pesticide and herbicide application.

Detailed Description Text (5):
In the BMBRTS, chopped whole-stalk kenaf both for both solid filtration and primary biological treatment. Thus, the BMBRTS contains both bast fibers and core. The kenaf plants are harvested with a standard forage harvester adjusted to produce fiber and core material approximately two inches (50.8 mm) in length. This length is preferred because it achieves excellent filtration and biological treatment characteristics while minimizing plugging.

Detailed Description Text (6):
While kenaf is the preferred bast producing plant, similar fibers may also come from roselle, flax, hemp, Chinese jute, jute, ramie, Sunn hemp, and nettle. The use of bast and core fibers from chopped whole-stalk kenaf for the attached growth medium does not preclude the usage of other bast producing plants for this purpose.

Detailed Description Text (7):
Because the biological material is kenaf, a cellulose-based fibrous plant, it is readily renewable. This allows the BMBRTS to function as a sustainable system. Once the bast medium fails (i.e., plugs), the kenaf reactor medium is removed and is used to produce a stabilized value added fertilizer or soil amendment via composting. This compost can then be efficiently exported from the animal production facility.

Detailed Description Text (9):
The BMBRTS is composed of five primary components. These are (1) a bast fiber screening filter (BFSF) for removal of settleable solids and some suspended solids, (2) a bast medium biological reactor (BMBR) designed to function as a modified attached growth biological reactor using chopped whole-stalk bast fiber and core as the attached growth medium, (3) an effluent holding reservoir (EHR) designed to serve as a pump, thereby providing primary clarification, (4) a recirculating pump to circulate wastewater through the various stages of the BMBRTS, and (5) a spent bast composting facility (SBCF) for stabilization of spent kenaf materials. A detailed description of the BMBRTS is set forth below.

Detailed Description Text (14):
When the bast treatment medium from the BFSF or the BMBR becomes plugged either from solids or from microbial slimes, such that the flow through the BMBRTS is compromised, it is replaced with new and/or renovated bast medium (i.e., progressive failure). The spent kenaf medium is transferred to the spent bast composting facility (SBCF) to be composted. The spent bast material, with its resident microbial slimes and organic solids, provides the nitrogen and carbon essential for proper composting. The SBCF provides a low odor aerobic, low cost means of stabilizing waste constituents contained in the bast medium. The stiff bast fibers and tubular core material create tremendous pore space in the spent filter material. This further accelerates the composting process by providing air space throughout the compost pile (aerobic degradation). Any imbalances in the carbon:nitrogen ratio can be adjusted chemically by using standard agricultural fertilizer or organically to optimize the composting process. Non-toxic, stabilized compost is then utilized on-site for crop production or exported off-site as a value-added plant fertilizer and/or soil amendment.

Detailed Description Text (31):
After 24 hours of treatment, there were some notable changes in the odor components as determined by the panelists. Specifically, across the board reductions in ammonia, sulfurous content, acridity, overall intensity, and fecal (skatole/cresol complex) content. Table 3 contains the mean odor panel response and statistical inferences for samples evaluated after 24 hours of recirculation. In particular, the mean odor response for both kenaf treatments (K15 & K50) was statistically different from the control. The mean odor intensity value for the K15 and K50 treatments was 3.35 and 3.29, respectively, which is about half of the mean odor intensity recorded for the control (control mean odor intensity=6.62). It is notable that in Table 3,

the mean response on the fecal odor component is the lowest for the kenaf treatments. It is also notable that after 24 hours, the kenaf treatments (K15 & K50) have taken on a decidedly "earthy" odor component. The mean "earthy" odor response for both kenaf treatments (K15 & K50) is the highest among the treatments after 24 hours. This is very important, since it indicates that an odor easily identifiable with "swine" was modified such that it was difficult for panelists to associate the odor with "swine". In addition, the "earthy" odor character combined with less "fecal" odor may be deemed less objectionable than in the anaerobic pit (control). This is the primary factor in the design and development of the BMBRTS, e.g., changing the odor character to one that cannot be associated with "swine".

Detailed Description Text (32):
The kenaf treatments were significantly different after 48 hours of recirculation from all other treatments for overall odor intensity and the odor component "earthy". In particular, results after 48 hours of recirculation (Table 4) show that the "earthy" odor component of the kenaf treatments (K15 & K50) had the highest mean value of the treatments. In addition, the mean "fecal" odor response for the kenaf treatments is the lowest of all treatments. However, they are not significantly different from the bioring treatments (B15 & B50). For the "intensity" odor component, the kenaf treatments have a higher mean response than the bioring treatments. With regard to mean odor intensity, the kenaf treatments are significantly different from the bioring treatments, and all treatments are statistically different from the control. The mean intensity value of the kenaf treatments is about half of the control value (mean odor intensity=6.16). There are no statistically significant differences between the bioring and kenaf treatments for acrid, ammonia, fecal, and sulfur odor components.

Detailed Description Text (33):
The results show that, based on mean response, the anaerobic (control) pit had the highest mean odor intensity at all sampling periods (2, 24, and 48 hours), with kenaf treatments next, and lastly the bioring treatments. This result is positive, since the higher odor intensities obtained from the kenaf treatments is likely tracking the increase in the earthy character imparted by the kenaf. This "odor character" was changed by the bioring and kenaf treatments to a point that virtually removes any association with swine odor. In particular, the kenaf treatments transformed the odor components associated with swine waste from a highly intense, acrid odor comprised of sulfurous, fecal, and ammoniacal components into an odor predominately comprised of an "earthy" character (similar to the odor of freshly tilled soil).

Detailed Description Text (38):
Tables 5 and 6 contain the BOD.sub.5 and COD composite data. For the K50 treatments, the BOD.sub.5 was reduced by about 90% after 6 hours of recirculation. During the same time interval, the high flow rate bioring (B50) treatment only achieved a 61% reduction in BOD.sub.5. At the completion of the batch run (48 hours), both the bioring and kenaf treatments had removed over 90% of the influent BOD.sub.5. The control (anaerobic pit) had an average BOD.sub.5 reduction of only 29% during this same time period (48 hrs). The COD values showed similar trends with the kenaf and bioring treatments both achieving over 85% reduction in COD in 48 hours. The COD for the control was reduced by about 47% during the same time interval.

Detailed Description Text (39):
FIGS. 5, 6, and 7 show the BOD.sub.5 and COD values over time for the 190 L/hr flow rate (B50 & K50), the 57 L/hr flow rate (B15 & K15), and the control, respectively. In general, the higher flow rates (190 L/hr) resulted in better treatment efficiencies for both the bioring and kenaf treatments. However, the low flow rate (57 L/hr) kenaf treatment outperformed the high rate (190 L/hr) kenaf treatment in COD reduction after 24 hours of recirculation. The 190 L/hr flow rate kenaf treatment shows the largest reduction in BOD.sub.5 and COD after 2, 4, and 6 hours of recirculation. The K50 BOD.sub.5 concentrations after only 6 hours of recirculation were 143 and 61 mg/L, respectively. At the same time interval, the high and low flow rate bioring treatments were 385 and 1050 mg/L, respectively. FIGS. 5 and 6 show that the BOD.sub.5 and COD for the bioring and kenaf treatments are about the same after 48 hours of recirculation (no additional manure added during the 48 hour test period). After 24 hours of recirculation, at the 57 L/hr

flow rate, the kenaf treatment is superior to the bioring treatment. However, this advantage diminishes after 48 hours.

Detailed Description Text (40):
Tables 7 and 8 contain the total solids and volatile solids data. FIGS. 8 and 9 show the TS and VS data versus time for the kenaf and bioring treatments. The kenaf and bioring treatments both reduced the TS and VS; however, the bioring treatments outperformed the kenaf treatments. This may be due to fragments of kenaf (a cellulose-based plant) being entrained in the wastewater, thus increasing the TS and VS concentration. This cannot occur with the biorings, since they are made from synthetic material.

Detailed Description Text (41):
The TS and VS data for the control (FIG. 10) are somewhat misleading, since the EHRs were not agitated during the 48 hour test period. Thus, the manure solids were allowed to settle in the EHR. The values reported in Tables 7 and 8 are from wastewater samples taken from the supernatant of the control EHR. If the manure solids were re-suspended by stirring, the TS and VS concentrations would likely have been much higher than that which is reported in Tables 7 and 8. In contrast, the bioring and kenaf treatments were continuously agitated by the recirculation pumps. Thus, the reduction in TS and VS for these treatments is due predominantly to microbial degradation for the biorings, whereas the kenaf medium provides both microbial degradation and particle entrapment (filtering).

Detailed Description Text (57):
By modeling the waste content of a commercial swine production facility utilizing a pit-recharge waste handling system, the amount of manure (based on MWPS-18) and urine produced in a three day period was placed in a five gallon container (sump). Dividing this amount into five dilutions (100%, 80%, 60%, 40%, and 20%), and circulating these dilutions through the kenaf bioreactors for 2 days helped establish an optimum loading rate for the kenaf bioreactors.

Detailed Description Text (58):
Using the waste loading experiment described above, an optimum waste percentage through the kenaf bioreactors was determined. After analyzing the data, the 40% waste solution (i.e., 40% of the manure and urine a 200 pound pig produces in three days mixed in a five gallon bucket with water) was selected as the most compatible for using biorings and kenaf as treatment mediums.

Detailed Description Text (64):
Reduction of TS is important because it gives an overall indication of the mechanical screening capability of the kenaf bioreactor to remove solids. Therefore, kenaf may be useful as a pretreatment for producing an effluent that can be used in a biological treatment process.

Detailed Description Text (71):
This data indicates that the kenaf medium may have an advantage over plastic mediums and standard anaerobic pits in removing ammonium from swine wastewater. Reduction in ammonium in the wastewater is important because it is the precursor to the formation of gaseous ammonia (NH.sub.3). This is important in intensive swine production facilities because in-house air quality affects human workers in the housing facility, swine growth rates, and overall respiratory health.

Detailed Description Text (74):
The reduction of the organic content (measured by COD) is the benchmark for determining the performance of any organic waste treatment system. Twenty-four COD samples were collected from the kenaf bioreactor treatments (12 high rate and 12 low rate samples). Twelve samples from the control (anaerobic pit simulator) and twelve samples from the two bioring (plastic media) treatments (6 high rate and 6 low rate samples) were taken. All of the samples were collected during a three day period. See FIG. 14 to view the COD versus time for the 48-hour treatment period. Reduction efficiencies for the treatments were determined to be (approximately):

Detailed Description Text (75):
This data indicates that there is no appreciable difference in COD removal between

the kenaf medium and the plastic medium after 48 hours of treatment. However, the kenaf medium produced a better COD reduction efficiency after 6 hours of treatment than either the plastic medium or the anaerobic pit.

Detailed Description Text (79):
Laboratory Scale Comparison of Kenaf versus Conventional/Non-Conventional Attached Growth Media

Detailed Description Text (80):
This experiment was conducted at the Agriculture and Biological Engineering Wastewater Research Facilities at Mississippi State University during the month of September, 1999. The purpose of this experiment was to evaluate the odor reduction and water treatment capacity of kenaf compared to other attached growth media (rocks, biorings, and pine chips) and standard treatment schemes (anaerobic pit) for use in the treatment of swine wastewater. The different media selected for use can be classified into three major categories: 1) Conventional, 2) Non-conventional, and 3) Standard treatment schemes. Further, these categories can be broken into two sub-classes: 1) Abiotic and 2) Biological. Conventional media would be those media that have been well studied and used in wastewater treatment. Non-conventional media would be those media that have not been well studied or are not currently in widespread use. Standard treatment schemes would refer to the anaerobic pit method currently used at most swine operations in Mississippi and around the Southeast United States. The sub-classifications abiotic and biological refer to the origin of the media. For example, river rocks are not produced by biological processes and biorings are synthetic (i.e. plastic). Thus, these are classified as abiotic. Pine chips and kenaf are harvested from living organisms, and are therefore classified as biological.

Detailed Description Text (82):
This experiment follows upon the same lines as the experiment presented in Example 1 set forth above. FIG. 1 of Example 1 represents the general treatment scheme for all media used, with the exception of the anaerobic pit. FIG. 2 of Example 1 is a picture of the laboratory apparatus used for this experiment. The experiment was conducted in a 6.times.2 configuration, i.e., six treatments (kenaf, small kenaf, rocks, biorings, pine chips, and pit) with two replications. Each reactor, referred to in FIG. 1 of Example 1 as the BMBR, was filled with the same volume of the selected media. The wastewater solution, olfactory evaluation, and wastewater sample analysis were each conduced as previously stated in Example 1. Samples were collected from the EHR of each treatment at timed intervals of 0 (initial), 2, 4, 6, 24, and 48 hours of treatment. Parameters measured for each sample were odor, BOD.sub.5, COD, TS, VS, TKN, NH.sub.3 (ammonia), TP, and OP. Acronyms for the treatments in this experiment are as follows: Pine chip, PC; Kenaf, K; Rocks, R; Biorings, BR; Pit, Pit; Small Kenaf, SK. The small kenaf treatments utilized the same volume of kenaf as the kenaf treatment (K), but was placed in a larger diameter container such that the cross-sectional area was increased.

Detailed Description Text (87):
The final ranking from best to poorest wastewater treatment is as follows: kenaf, pine chips and biorings (tie), small kenaf, rocks, and lastly the anaerobic pit simulator. While these results show that the kenaf media was the best media analyzed, viewing the data tables and graphs shows that there is little or no difference in end-point treatment of the swine wastewater. Therefore, it can be stated that kenaf performed as well as, and in some cases, better than the other conventional and non-conventional media.

Detailed Description Text (89):
Olfactory evaluation procedures have previously been discussed in Example 1. Of note, odor data for the small kenaf (SK) treatment was not taken due to laboratory constraints. The pine chip (PC) data at t=24 hours was missing. Tables 32, 33, and 34 present the mean panelist response for each treatment and odor component as well as statistical inference of the data. As stated in Example 1, Duncan's Multiple Range test was used to compute statistical inference.

Detailed Description Text (90):
Table 32 presents the olfactory evaluation results at t=0 hours of treatment. As the

data shows, there is no major statistical difference in any of the treatments. Table 33 presents the olfactory evaluation results at t=24 hours of treatment. The data shows that for the odor components intensity, acridity, musty, fecal, and cheesy the anaerobic pit simulator (Pit) is significantly different from all other treatments. Further, for the same components, kenaf is not significantly different from any other conventional or non-conventional media tested. The earthy component data shows that kenaf was significantly different from all other treatments tested, including the anaerobic pit simulator. The odor component NH.sub.3 (ammonia) is not significantly different for any treatment, although it must be noted that the olfactory panel did not detect any ammonia in the kenaf (K) and bioring (BR) treatments.

Detailed Description Text (91):
Table 34 presents the olfactory evaluation results at t=48 hours of treatment (i.e., the endpoint of the experiment). Data for the odor components intensity, acridity, sulfur, fecal, and cheesy show that the anaerobic pit simulator (Pit) was significantly different from all other treatments tested. Further, odor intensity was not significantly different between the kenaf (K) and bioring (BR) treatments, both of which scored in the lower mean response group. The data for the odor component earthy shows that the pine chip (PC) treatment was significantly different from all other treatments tested. Further, the kenaf (K) and rock (R) treatments ranked second to the PC treatment in mean response. The data for odor component musty shows no significant difference between any of the treatments tested. The data for odor component fecal shows that the anaerobic pit simulator (Pit) scored the highest mean response and was significantly different from all other treatments tested. The rock treatment (R) scored second in mean response and was significantly different from all other treatments. Finally, the kenaf (K), bioring (BR), and pine chip (PC) treatments were in the lowest mean response group for the fecal component and were not significantly different from each other. There was no significant difference between any treatment for the ammonia (NH.sub.3) odor component.

Detailed Description Text (92):
In summary, the data shows that all treatments, excluding the anaerobic pit simulator (Pit), reduced the fecality, sulphurous, and acridity components as well as the overall intensity of the swine wastewater. Further, this data demonstrates that the kenaf media performed as well as, and in some cases better than the conventional and non-conventional media used for comparison.

Detailed Description Text (95):
A pilot scale BMBRTS was implemented in a small swine facility located near the Mississippi State University campus. See FIG. 24. The barn was arranged to provide a 120 ft.sup.2 pen over each of the two flush alleys present. The flush alleys were plugged to form wastewater collection pits similar to those used in commercial swine production facilities. See FIG. 25. The pilot scale BMBRTS was installed on one of the wastewater collection pits in the barn, while the other wastewater collection pit was equipped with an aeration system. The pens contained slatted floors, which allowed feces and urine to fall into the wastewater collection pits below. On the pen equipped with the BMBRTS technology, wastewater was pumped (see FIG. 26) from the wastewater collection pits (serving as the EHR) at a rate of 5 gallons per minute to the top of the BMBR. The BMBR used in the pilot study was 26.times.42.times.48 inches (depth x width x height), resulting in a total volume of 30 ft.sup.3. See FIG. 27. The BMBR was filled with chopped whole-stalk kenaf fibers. The wastewater proceeded through the BMBR via gravity. As the wastewater trickled through the kenaf, resident microorganisms processed the wastewater, thereby reducing odor and wastewater nutrients.

Detailed Description Paragraph Table (2):
Kenaf Bioreactor High Rate 86% Low Rate 61% Anaerobic Pit Simulator Rep 1 21% Rep 2 21% Bioring Reactors High Rate 26% Low Rate 35%

Detailed Description Paragraph Table (3):
Kenaf Bioreactor High Rate 87% Low Rate 87% Anaerobic Pit Simulator Rep 1 46% Rep 2 49% Bioring Reactors High Rate 87% Low Rate 86%

Other Reference Publication (1):

Burcham, T.N. et al. "Using Dairy Effluent to Produce Kenaf for Whole-Stalk Freestall Bedding," In Proceedings of the Ninth annual International Kenaf Association Conference, La Posada Resort Hotel, Scottsdale, AZ (Mar. 27-29, 1997). p. 7.

Other Reference Publication (4):
Hollowell, J.E., et al. "Evaluation of Kenaf as a Potential Forage for the Southeast United States." In Proceedings of the Eigth Annual International Kenaf Association Conference, Albuquerque Convention Center, Albuquerque, NM (Mar. 21-23, 1996). pp. 36-43.

Other Reference Publication (11):
Reichert, N.A. et al. "Mississippi State University Kenaf-Based Potting Media: From Refinement to Commercialization," In Proceedings of the Eigth Annual International Kenaf Association Conference, Albuquerque Convention Center, Albuquerque, NM (Mar. 21-23, 1996). pp. 50-55.

Other Reference Publication (12):
Sellers Jr., T. et al. "Kenaf Core as a Board Raw Material," Forest Products Journal, vol. 43, No. 7/8 (Jul./Aug., 1993).

Other Reference Publication (13):
Ramaswamy, G.N. et al. "Durability and Aesthetic Properties of Kenaf/Cotton Blend Fabrics," Textile Research Journal, vol. 67, No. 11:803-808 (Nov., 1997).

CLAIMS:

1. A system for treating wastewater comprising: a holding reservoir, a pump, a filtration device, a first aeration space, a biological reactor, and a second aeration space; wherein said pump pumps said wastewater from said holding reservoir to said filtration device where said wastewater then flows consecutively through said filtration device, said first aeration space, said biological reactor, and said second aeration space into said holding reservoir; and wherein said filtration device and biological reactor contains both bast and core fibers as a biological treatment medium, said bast and core fibers being whole-stalk chopped kenaf.

10. A method for treating wastewater comprising the steps of: collecting said wastewater in a holding reservoir, pumping said wastewater to a filtration device, flowing said wastewater consecutively through said filtration device, a first aeration space, a biological reactor, and a second aeration space into said holding reservoir, wherein said filtration device and biological reactor contain both bast and core fibers as a biological treatment medium, said bast and core fibers being whole-stalk chopped kenaf.

WEST

Generate Collection Print

L5: Entry 7 of 15 File: USPT Mar 27, 2001

DOCUMENT-IDENTIFIER: US 6207729 B1
TITLE: Texturized cellulosic and lignocellulosic materials and compositions and composites made therefrom

Brief Summary Text (10):
Compositions that include the texturized fibrous materials described above, together with a chemical or chemical formulation (e.g., a pharmaceutical such as an antibiotic or contraceptive, optionally with an excipient; an agricultural compound such as a fertilizer, herbicide, or pesticide; or a formulation that includes enzymes) are also within the scope of the invention, as are compositions that include the texturized fibrous materials and other liquid or solid ingredients (e.g., particulate, powdered, or granulated solids such as plant seed, foodstuffs, or bacteria).

Detailed Description Text (2):
Examples of cellulosic raw materials include paper and paper products such as newsprint and effluent from paper manufacture; examples of lignocellulosic raw materials include wood, wood fibers, and wood-related materials, as well as materials derived from kenaf, grasses, rice hulls, bagasse, cotton, jute, other stem plants (e.g., hemp, flax, bamboo; both bast and core fibers), leaf plants (e.g., sisal, abaca), and agricultural fibers (e.g., cereal straw, corn cobs, rice hulls, and coconut hair). Aside from virgin raw materials, post-consumer, industrial (e.g., offal), and processing waste (e.g., effluent) can also be used as fiber sources.

Detailed Description Text (10):
Texturized fibrous materials and compositions and composites of such fibers with other chemicals and chemical formulations can be prepared to take advantage of the material's properties. The materials can be used to absorb chemicals, for example, potentially absorbing many times their own weight. Thus, the materials could, for instance, be used to absorb spilled oil, or for clean-up of environmental pollution, for example, in water, in the air, or on land. Similarly, the material's absorbent properties, together with its biodegradability, also make them useful for delivery of chemicals or chemical formulations. For example, the materials can be treated with solutions of enzymes or pharmaceuticals such as antibiotics, nutrients, or contraceptives, and any necessary excipients, for drug delivery (e.g., for treatment of humans or animals, or for use as or in animal feed and/or bedding), as well as with solutions of fertilizers, herbicides, or pesticides. The materials can optionally be chemically treated to enhance a specific absorption property. For example, the materials can be treated with silanes to render them lipophilic.

Detailed Description Text (11):
Compositions including texturized materials combined with liquids or particulate, powdered, or granulated solids can also be prepared. For example, texturized materials can be blended with seeds (i.e., with or without treatment with a solution of fertilizer, pesticides, etc.), foodstuffs, or bacteria (e.g., bacteria that digest toxins). The ratio of fibrous materials to the other components of the compositions will depend on the nature of the components and readily be adjusted for a specific product application.

Detailed Description Text (24):
For example, a composition containing 90% by weight texturized cellulosic or lignocellulosic material and 10% by weight ammonium phosphate or sodium bicarbonate

can be prepared in a cone blender to create a fire-retardant material for absorbing oil.

Detailed Description Paragraph Table (4):
Composition No. 3 Ingredient Amount (g) HDPE.sup.1 160 Fiber paper.sup.2 216 3.1 mm texturized kenaf 24 Coupling agent.sup.3 8 The properties of Composition No. 3 are as follows: Flexural strength (10.sup.3 psi) 11.4 (ASTM D790) Flexural modulus (10.sup.5 psi) 6.41 (ASTM D790)

WEST

Generate Collection | Print

L5: Entry 8 of 15 File: USPT Oct 26, 1999

DOCUMENT-IDENTIFIER: US 5970582 A
TITLE: Method for separating kenaf into core and fiber

Abstract Text (1):
A method and apparatus for separating kenaf into fiber and core uses a modified stick machine conventionally used in the cotton industry for removing trash from unginned cotton. Lengths of kenaf are delivered onto the periphery of a saw cylinder so the toothed wheels snag the fiber and draw the kenaf across a grate. Core is detached from the fiber, passes through the grate and is delivered to a core outlet. Fiber on the toothed wheels are removed by a doffing wheel and delivered to a fiber outlet. Multiple saw cylinder/doffing wheel assemblies are provided.

Brief Summary Text (1):
This invention relates to a method and apparatus for separating kenaf into its constituents of core and fiber.

Brief Summary Text (3):
Kenaf is a plant of considerable potential, as yet mostly unfulfilled. It is native to central Africa and has been cultivated in Egypt for thousands of years as a source of fiber for making clothing, rugs, rope and other products, as well as for other uses. Kenaf grows to heights of 12-18 feet in a 150 day season and requires little or no pesticides or herbicides if it is grown in the right locale. Kenaf can produce 5-10 tons of dry fiber and core per acre. The plant has two distinct types of material: an outer fiber known as fiber, bast or bast fiber, comprising about one-third by weight of the plant, and a core. The core is a low density woody type material while the bast is a much lower density fluffy type fiber of high tensile strength. As harvested, the bast fibers tenaciously adhere to the core. In a typical harvested kenaf crop, the core is slightly tapered from bottom to top and has a small diameter at the top in the range of 1/4-1/2".

Brief Summary Text (4):
The core and fibers have distinctly different uses and must be separated before they are suitable for these different uses. The core is useable as animal bedding, oil-absorbent material for oil spill cleanup, animal bedding, potting soil, kitty litter and particle board or other similar construction materials.

Brief Summary Text (5):
The most promising high volume use of bast fibers is in paper manufacture. Another potential high volume use is in the manufacture of fiberboard used in automotive door panels and the like. The economics of bast fibers in these high volume situations are attractive because the cost of the cultivated crop compares very favorably to the cost of timber which is the conventional source of fiber used in paper and fiberboard production. The difficulty has been in separating the core from the bast fibers in large quantities. Many different attempts have been made, all heretofore futile, to separate kenaf core from fiber on an industrial scale.

Brief Summary Text (6):
The disclosure of a kenaf separator mounted on the back of a tractor is found in U.S. Pat. No. 2,755,511. Other disclosures of interest are found in U.S. Pat. Nos. 870,838; 1,797,507; 2,688,161; 2,817,119 and 4,974,293.

Brief Summary Text (8):

In this invention, a slightly modified conventional separator used in a cotton gin, known as a stick machine, is used to separate kenaf into core and fiber. A conventional stick machine includes a series of separating stations, each station comprising a saw cylinder-grate assembly and a doffing wheel. Multistage stick machines typically have one or more arrangements comprising two saw cylinder-grate assemblies and a single doffing wheel. The saw cylinders comprise a multiplicity of toothed wheels spaced apart by disks or a toothed band fastened to a drum. The teeth snag the fibers and rotate the kenaf lengths past a grate. As the kenaf moves past the grate, the core contacts the grate and stops or slows down. The fiber, snagged on the saw teeth, continue to rotate. The core is thereby detached from the fiber and passes through the grate toward a core outlet. Fibers adhere to the saw cylinder and are removed by a doffing wheel which comprises a plurality of metal or brush type fingers. The doffing wheel is rotated faster than the saw cylinder and the fingers act to remove the fibers from the saw cylinder in the conventional manner of doffing wheels. Fibers removed from the doffing wheel move toward a fiber outlet.

Brief Summary Text (10):
An important feature of this invention is to break the core material before attempting separation of the core and fiber. Typically, the kenaf stalk is cut into predetermined lengths corresponding to the desired length of the bast fiber. This operation breaks the core material to some extent because it is roughly analogous to balsa wood and is thus considerably more brittle than the bast fibers. In this invention, an additional step is conducted to break the core particles before a separation stage, without cutting the bast fibers.

Brief Summary Text (12):
Batches of kenaf, cut to a predetermined length in the range of 1/2-12" is fed into the inlet of a multistage stick machine. Core material is delivered from one outlet of the stick machine and fiber is delivered from the other outlet.

Brief Summary Text (13):
It is an object of this invention to provide an improved method and apparatus for separating kenaf into its constituent fiber and core.

Brief Summary Text (14):
Another object of this invention is to provide a method for separating kenaf into its constituent core and fiber on an industrial scale.

Brief Summary Text (15):
A further object of this invention to provide an improved saw cylinder-grate assembly for separating kenaf into core and fiber.

Drawing Description Text (2):
FIG. 1 is a schematic flow diagram of a kenaf processing plant;

Detailed Description Text (2):
Referring to FIGS. 1-10, a kenaf processing plant 10 is partially shown and comprises, as major components, an inlet device 12, a stalk cutter 14, a crimper 16, a conveying system 18, a feed controller 20, a dryer 22, a slightly modified stick machine 24, a core handling assembly 26, a final separating assembly 28 and a fiber handling assembly 30.

Detailed Description Text (3):
The inlet device 12 may be a hopper for receiving kenaf harvested from a field, a module feeder for receiving and disintegrating kenaf modules, suction pipes for vacuuming kenaf from a vehicle or trailer, or the like. The kenaf is cut to a predetermined length, typically 1/2-12", corresponding to the desired length of the bast fibers. This may be done in the field at the time of harvesting or may be done in the plant 10 by a conventional stalk cutter 14 of any suitable design of which there are many known versions.

Detailed Description Text (4):
Heretofore, attempts to separate kenaf into its constituent bast fibers and core have operated on cut lengths of kenaf stalk. This inevitably starts the separation of the core from the bast fibers because there is considerable pulling of the fiber

from the core and considerable breakage of the more brittle core. Describing the core as brittle is, of course, relative. Relative to the bast fibers, the core is brittle. Relative to soft woods such as balsa, the core is not brittle and is surprisingly tough. In any event, separation of the core from the fibers is enhanced by breaking the core into smaller pieces without severing the bast fibers. This is conveniently done in a crimper 16 which comprises an important part of this invention, particularly when dealing with longer cut lengths of kenaf which correspond to longer desired lengths of fiber.

Detailed Description Text (5):
One embodiment of the crimper 16 is shown in FIG. 2 where the crimper 16 comprises a hopper or inlet 32 sloping downward to a pair of counterrotating cylinders 34 having teeth or ribs 36 extending outwardly from the cylinders 34. The cylinders 34 are driven about their axes 38 so the teeth or ribs 36 interdigitate but do not meet like scissor blades. Thus, the kenaf pieces pass through the bight between the cylinders 34 and the core is crimped or broken between the teeth 36 but the fiber is not broken.

Detailed Description Text (6):
Referring to FIG. 3, there is illustrated another embodiment 40 of a crimper. A potential difficulty with the crimper 16 is the kenaf pieces can theoretically fall horizontally between the cylinders 34 so the interdigitated teeth 36 are ineffective. The crimper 40 includes an inlet hopper (not shown) feeding kenaf pieces into the bight between a pair of horizontal corrugated cylinders 42 mounted for rotation about axes 44 in suitable bearings. The corrugated cylinders 42 include large ribs 46 merging smoothly with valleys 48. The adjacent cylinders 42 are positioned so the ribs 46 of one of the cylinders nest with the valleys 48 of the other cylinder and the gap between the surfaces of the cylinders 42 is essentially the same throughout the length of the nested periphery. The gap is less than the smallest diameter of kenaf expected to be run through the crimper 40. Thus, the gap is typically slightly smaller than 1/4". The core of kenaf pieces moving horizontally through the crimper 40 are broken by the undulations in the cylinders 42. The core of kenaf pieces moving vertically through the crimper is crushed. Either of these variations acts to loosen the bond between the bast fibers and the core. It will be evident that the bast fibers are not severed by either of the crimpers 16, 40. It will also be apparent that other versions of crimpers may be employed.

Detailed Description Text (7):
After passing through the crimper 16 or the crimper 40, the kenaf is conveyed to the next operating station by the conveying system 18. The conveying system 18 is of any suitable design and may comprise a forced air system for blowing the kenaf toward the next station, a vacuum system drawing the kenaf toward the next station or a combination of both. As illustrated, the conveying system 18 comprises a series of conduits 50 extending between one operating station and the next and a series of air separator-exhaust fan assemblies 52. The assemblies 52 each include a separator housing 54 receiving kenaf and air from a previous operating station through an inlet 56, an exhaust fan 58 delivering air out of an outlet 60 and a kenaf outlet 62. The assemblies 52 are commercially available, such as from Lummus Corporation of Savannah, Ga.

Detailed Description Text (8):
In the event a forced air system is used, or partially used, the conveying system 18 includes a series of air injectors 64 inject compressed air into the conduit 50. The air injectors 64 are of conventional designed, used in the cotton industry to inject compressed air into conduits to convey unginned cotton toward a gin. Commercial devices are available from Consolidated Gin Company of Lubbock, Tex. The injector 64 is connected to the conduit 50 and conveys the cut, crimped kenaf to the next separator assembly 52.

Detailed Description Text (9):
Downstream of the separator assembly 52 is an air lock 66 which is also conventional equipment used in the cotton ginning industry for delivering kenaf to the downstream operational unit without delivering a large amount of air. Conventional air locks are available from Consolidated Gin Company of Lubbock, Tex. The air lock 66

delivers kenaf into the feed controller 20.

Detailed Description Text (10):
The stick machine 24 is preferably operated under steady flow conditions rather than pulsing or surging flow conditions. The feed controller 20 accordingly receives kenaf under pulsating or surging conditions and delivers kenaf under relatively steady flow conditions. The feed controller 20 is commercially available, such as from Consolidated Gin Company of Lubbock, Tex.

Detailed Description Text (11):
Downstream of the feed controller 20 is a conventional drier 22 where the moisture content of the kenaf is reduced to levels which promote separation. The drier 22 may be of any suitable type, such as is available commercially from Samuel Jackson, Inc. of Lubbock, Tex. known as a fountain drier or from Continental Gin Company of Pratville, Ala. known as a tower drier.

Detailed Description Text (13):
The assembly 72 also includes a grate 90 comprising a pair of brackets 92 affixed to a side wall 94 of the stick machine 24 and a series of round bars or pipe sections 96 extending across the length of the saw cylinder 80 as shown best in FIG. 7. The bracket 92 is adjustably mounted toward and away from the saw cylinder 80 by one or more adjustment slots 98. In conventional operation, the bast fiber of kenaf pieces are snagged by the rotating teeth 84 of the saw cylinder 80 of the first assembly 72 and drug across the bars 104 thereby dislodging core pieces from the snagged fiber. The core pieces pass through the gaps between the bars 104 and are deflected by a baffle 100 toward the second assembly 76.

Detailed Description Text (15):
There is a tendency for the kenaf pieces to become jammed between the rotating saw cylinders 80 and the grates 90. When this occurs, an observer will see product entering the stick machine 24 but little or nothing coming out. The only thing to do is stop operation, open one or more of the side panels 94, 102, visually determine where the blockage is and pull the jammed kenaf from the saw cylinder. An important part of this invention is a modification to the grate 90 comprising one or more plates or straps 104 to ameliorate this problem.

Detailed Description Text (28):
Air and fiber leave the separator 28 through a conduit 170 to an air separator-exhaust fan assembly 172 having an exhaust fan 174 delivering air out of an outlet 176 and a kenaf outlet 178. The air supplied to the separator 28 is balanced, i.e. the volume of air delivered by the injector 138 is the same as the volume of air withdrawn by the exhaust fan 174. Thus, there is little or no air movement into or out of the core outlet 164 or the housing 140 even though the lid 142 is unsealed.

Detailed Description Text (30):
This invention allows for the separation of kenaf into its constituent fiber and core on an industrial scale. This invention has succeeded in the face of numerous failed attempts in the prior art to process kenaf on an industrial scale.

CLAIMS:

1. A method of separating kenaf into its constituents of fiber and core comprising the steps of

delivering lengths of kenaf onto a periphery of a saw cylinder comprising a multiplicity of spaced apart teeth;

rotating the saw cylinder and snagging the fiber on the teeth, moving snagged lengths of kenaf into contact with a grate and delivering pieces of core through the grate thereby separating the core from the fiber; and

removing the fiber from the saw cylinder.

2. The method of claim 1 further comprising breaking the core into lengths

substantially shorter than the fiber before delivering the kenaf onto the periphery of the saw cylinder.

3. The method of claim 2 wherein the core is substantially weaker in bending than the fiber and the breaking step comprises bending the lengths of kenaf and snapping the core into sections without severing the fiber.

4. The method of claim 3 wherein the bending step comprises crimping the lengths of kenaf.

6. The method of claim 1 further comprising subjecting the core to another separation operation by

directing pieces of core, delivered through the first mentioned grate, onto a periphery of a second saw cylinder comprising a multiplicity of spaced apart teeth;

rotating the second saw cylinder and snagging fiber on the teeth, moving snagged lengths of kenaf into contact with a second grate and delivering pieces of core through the second grate thereby separating the core from the fiber; and

removing the fiber from the second saw cylinder.

7. The method of claim 6 further comprising subjecting the fiber to another separation operation by

directing fiber, removed from the first saw cylinder, onto a periphery of a third saw cylinder comprising a multiplicity of spaced apart teeth;

rotating the third saw cylinder and snagging fiber on the teeth, moving snagged lengths of kenaf into contact with a third grate and delivering pieces of core through the third grate thereby separating the core from the fiber; and

removing the fiber from the third saw cylinder.

WEST

Generate Collection Print

L5: Entry 9 of 15 File: USPT Feb 2, 1999

DOCUMENT-IDENTIFIER: US 5865824 A
TITLE: Self-texturing absorbent structures and absorbent articles made therefrom

Brief Summary Text (12):
The absorbent articles of the present invention can serve as disposable diapers, feminine pads, incontinence pads, sweat absorbing pads or liners, portions of disposable garments, meat and poultry pads for absorbing meat juices, breast pads, surgical absorbent pads, wound dressings and bandages, oil absorbing pads, pads for absorbing industrial waste and toxic spills, moisture absorbing inserts for food products, and the like. The structures disclosed herein may be further supplemented with additives and absorbent materials known in the art, or with additional layers of material such as meltblown webs, spunbond webs, plastic laminates, embossed plastic film, apertured films, elastic materials, detachable inserts, and the like, as is known in the art of preparing absorbent articles for body fluids and other liquids.

Detailed Description Text (10):
As used herein, "high yield pulp fibers" are those papermaking fibers produced by pulping processes providing a yield of about 65 percent or greater, more specifically about 75 percent or greater, and still more specifically from about 75 to about 95 percent. Yield is the resulting amount of processed fiber expressed as a percentage of the initial wood mass. Such pulping processes include bleached chemithermomechanical pulp (BCTMP), chemithermomechanical pulp (CTMP) pressure/pressure thermomechanical pulp (PTMP), thermomechanical pulp (TMP), thermomechanical chemical pulp (TMCP), high yield sulfite pulps, and high yield Kraft pulps, all of which leave the resulting fibers with high levels of lignin. High yield fibers are well known for their stiffness (in both dry and wet states) relative to typical chemically pulped fibers. The cell wall of kraft and other non-high yield fibers tends to be more flexible because lignin, the "mortar" or "glue" on and in part of the cell wall, has been largely removed. Lignin is also nonswelling in water and hydrophobic, and resists the softening effect of water on the fiber, maintaining the stiffness of the cell wall in wetted high yield fibers relative to kraft fibers. The preferred high yield pulp fibers can also be characterized by being comprised of comparatively whole, relatively undamaged fibers, high freeness (250 Canadian Standard Freeness (CSF) or greater, more specifically 350 CSF or greater, and still more specifically 400 CSF or greater), and low fines content (less than 25 percent, more specifically less than 20 percent, still more specifically less that 15 percent, and still more specifically less than 10 percent by the Britt jar test). In addition to common papermaking fibers listed above, high yield pulp fibers also include other natural fibers such as milkweed seed floss fibers, abaca, hemp, kenaf, bagasse, cotton and the like.

Detailed Description Text (27):
The bodyside liner or topsheet may comprise materials known in the art, including apertured films; nonwoven webs such as spunbond, meltblown, or bonded carded webs; spunlaced or hydroentangled webs; creped or uncreped tissues, including soft uncreped through-air dried webs such as those disclosed by Farrington et al., U.S. Pat. No. 5,607,551, previously incorporated by reference; and the like. The topsheet may be apertured, slit, embossed, perforated, and the like, and may be treated with softening agents, surfactants for improved hydrophilicity, hydrophobic matter and fibers for improved dry feel, as disclosed in the aforementioned copending application of Chen et al. entitled "Dual-Zoned Absorbent Webs", emollients,

bactericides and fungicides, and the like, for improved performance, health, and comfort. In one embodiment, the topsheet comprises a bonded carded web (BCW) which has a basis weight in the range of about 10-40 gsm and is composed of fibers having a fiber denier within the range of about 1.0-3.0 dpf. In some embodiments, the topsheet also serves as the stability layer, wherein the expansion layer is deposed below the topsheet. However, this is normally not preferred because of the high stiffness that is desirable in the stability layer, which stiffness may result in discomfort against the skin. In a separate embodiment, the expansion layer also serves as the topsheet, with a stability layer being below the expansion layer.

Detailed Description Text (32):
The absorbent structures of the present invention are described herein in relationship to their use in disposable absorbent articles, but it should be understood that potential uses of the absorbent structures of the present invention need not be limited to disposable absorbent articles. As used herein, the term "disposable absorbent article" refers to articles which absorb and contain body exudates and are intended to be discarded after a limited period of use. They are not intended to be laundered or otherwise restored for reuse. The articles can be placed against or in proximity to the body of the wearer to absorb and contain various exudates discharged from the body, including but not limited to urine, menses, sweat, blood, wound exudates, saliva, mucous, and feces. In addition, absorbent articles for removal of other fluids are envisioned, such as advanced paper towels to remove liquids from hands; industrial wipers; oil absorbent materials for industrial and home use; absorbent articles for removal of chemical spills; absorbent pads for packaging of meats, poultry, and vegetables to remove fluids; and the like.

WEST

Generate Collection | Print

L5: Entry 11 of 15 File: USPT Mar 12, 1996

DOCUMENT-IDENTIFIER: US 5498478 A
**** See image for Certificate of Correction ****
TITLE: Polyethylene glycol as a binder material for fibers

Brief Summary Text (12):
U.S. Pat. No. 4,010,308 of Wiczer describes foamed porous coated fibers. Fibers, described as organic or inorganic fibers of any character, are described as being coated with a foamable plastic material. Thermoplastic and thermosetting coatings are mentioned. In several examples, the coated fibers are made by passing continuous extruded filaments through a first bath of a ten percent polystyrene solution on toluene, evaporating the solvent, and passing the polystyrene coated fiber through a second bath containing a blowing agent, such as liquid n-pentane. The treated filaments are then heated to foam the coating. Rolls are used to rub solid particles into the porous surface of the foam coating. Fireproofing agents, lubricants such as graphite, pigments, and insecticides are among the examples of solid materials mentioned as suitable for rubbing into the coating. In another example, short lengths of cotton linters are described as being wet with a ten percent solution of a copolymer of polystyrene and acrylonitrile in about equal proportions dissolved in benzene. The solvent is evaporated in an air stream and the resulting coated cotton fiber is dipped in mixed pentanes. The product is then stirred in boiling water to cause foaming. Following foaming, the product is centrifugally dried and again dried in an air stream. The fiber is then mixed with a dry powder to fill the pores in the foamed coating with the powder. The placement of this fiber product in a container and heating the product to cause the adherence of the fiber surface contact points is also mentioned. The Wiczer patent appears to use a solution dipping approach as a means of applying the coating to the fibers.

Brief Summary Text (19):
The solid particulate material is adhered to the fibers by the binder material. Although not limited to specific materials, the particulate materials may comprise at least one material selected from the group comprising a pigment material, a super absorbent material, an electrically conductive material, a fertilizer, an insecticide, and a fire retardant material. Other examples of particles and particle categories are set forth in the specification below.

Detailed Description Text (2):
The present invention is applicable to treated discontinuous synthetic and natural fibers. The term natural fibers refers to fibers which are naturally occurring, as opposed to synthetic fibers. Non-cellulosic natural fibers are included, with chopped silk fibers and wool being specific examples. In addition, the term natural fibers includes cellulosic fibers such as wood pulp, bagasse, hemp, jute, rice, wheat, bamboo, corn, sisal, cotton, flax, kenaf, and the like and mixtures thereof. The term discontinuous fibers refers to fibers of a relatively short length in comparison to continuous fibers treated during an extrusion process used to produce such fibers. The term discontinuous fibers also includes fiber bundles. The term individual fibers refers to fibers that are comprised substantially of individual separated fibers with at most only a small amount of fiber bundles. Chopped or broken synthetic fibers also fall into the category of discontinuous fibers. Although not limited to any particular type of fiber, the synthetic fibers commonly are of polyethylene, polypropylene, acrylic, polyester, polyaramid (e.g. KEVLAR.TM., rayon and nylon. Discontinuous fibers of inorganic and organic materials, including cellulosic fibers, such as cellulose acetate, cellulose triacetate, etc., are also

included. The natural fibers may likewise be of a wide variety of materials, such as mentioned previously. The fibers may be subjected to fibrillation, for example by mechanical or ultrasonic means to break the fibers into fibers of smaller cross sectional dimension and to disperse clumps or bundles of fiber prior to treatment.

Detailed Description Text (6):
The fibers may be pretreated prior to the application of a binder to the fibers as explained below. This pretreatment may include physical treatment, such as subjecting the fibers to steam or chemical treatment, such as cross-linking the fibers. Although not to be construed as a limitation, examples of pretreating fibers include the application of fire retardants to the fibers, such as by spraying the fibers with fire retardant chemicals. Specific fire retardant chemicals include, by way of example, sodium borate/boric acid, urea, urea/phosphates, etc. In addition, the fibers may be pretreated with surfactants or other liquids, such as water or solvents, which modify the surface of the fibers. Sizing of fibers with sizing agents, such as starch, polymers and alkyl ketene dimer are yet other examples of possible fiber pretreatment. The fibers may also be pretreated in a way which increases their wettability. For example, natural fibers may be pretreated with a liquid sodium silicate, as by spraying the fibers with this material, for pretreatment purposes. Wettability of the surface of fibers is also improved by subjecting the fibers to a corona discharge pretreatment in which electrical current is discharged through the fibers in a conventional manner. In the case of both synthetic fibers and wood pulp fibers, corona discharge pretreatment results in oxygen functionality on the surface of the fibers, making them more wettable. The fibers may also be pretreated with conventional cross-linking materials and may be twisted or crimped, as desired. Pretreating cellulose fibers with chemicals which result in lignin or cellulose rich fiber surfaces may also be performed in a conventional manner. Also, pretreatment with materials such as silane enhances the adhesion between fibers and polymers or other substances. Bleaching processes, such as chlorine or ozone/oxygen bleaching may also be used in pretreating the fibers. In addition, the fibers may be pretreated, as by slurrying the fibers in baths containing antimicrobial solutions (such as solutions of antimicrobial particles as set forth below), fertilizers and pesticides, and/or fragrances and flavors, for release over time during the life of the fibers. Fibers pretreated with other chemicals, such as thermoplastic and thermoset resins may also be used. Combinations of pretreatments may also be employed with the resulting pretreated fibers then being subjected to the application of the binder coating as explained below.

Detailed Description Text (49):
Although not limited to specific materials, examples of suitable particulate materials include pigments and whiteners, such as inorganic pigments including titanium dioxide, ferrous oxide, PbO, AlO and CaCO.sub.3 (CaCO.sub.3 can also function as a filler in paper making applications and is not as white of a pigment as TiO.sub.2) and organic pigments or colorants, such as Morton Hytherm Purple KI from Morton Thiokol Company of Chicago, Illinois; ultraviolet, infrared or other wave length blocking or inhibiting particulates, such as carbon blacks as an ultraviolet inhibitor and zirconium carbide as an infrared inhibitor; fire retardant materials, such as alumina trihydrate, antimony oxide, chlorinated and brominated compounds, pentabromochlorocyclohexane, 1, 2-Bis (2, 4, 6-tribromophenoxy ethane, decabromodiphenyl oxide, molybdenum oxide and ammonium flyroborate, etc.; electrically conductive materials, such as metallic powders and carbon black; abrasive materials, such as ceramics, grit and metallic powders (with flint, garnet, sand, corundum, silicon carbide and stannous oxide, fly ash, stellite and silica being specific examples); acidular materials, such as clay, talc and mica, used as papermaking additives; oleophilic materials such as polynorbornene and fumed silica; hydrophobic materials; and hydrophilic materials, such as hydrophillic silica (e.g. silane treated foamed silica) and super absorbent particles; pesticides and insecticides, such as GUTHION.TM. pesticide (O, O-dimethyl S-4-0x0-123-benzotriazin-3-(4H)ylmethyl phosphorodithioate, etc.; fertilizers; seeds; antimicrobial particulates, such as broad spectrum antimicrobials (e.g. hypochlorites, perborates, quaternary ammonium compounds, bisulfites, peroxides, etc.), narrow spectrum antimicrobials (e.g. chloramphenacol, 1-[2, 4-dichloro-.beta.-(2, 4-dichlorobenzyloxy) phenethyl] imidazole nitrate, [1-(o-chloro .alpha., .alpha.-diphenyl benzyl) imidazole, etc.), antivirals, antimycotics, antibacterials, antirickettsials, antibiotics, biocides, biostats,

etc., and mixtures thereof; molecular sieves, such as odor absorbing sieves (ABSCENTS.TM., odor absorbing sieves, e.g. sodium alumino silicates), drying agents (molecular sieves, magnesium sulfate, sodium sulfate, etc. and activated carbon); zeolites, e.g. based upon alumino phosphates and which may be modified to have antimicrobial properties; acids and bases, for example to alter the pH of a hazardous spill (ammonium chloride, aluminum sulfate, calcium carbonate, sodium bicarbonate, etc.; fiber appearance modifiers, such as mica, phosphorescent compounds (e.g. luciferin/luciferase, zinc sulfide/manganese); microspheres, including microencapsulated particles comprising time release microspheres which may contain a variety of chemicals, such as fertilizers and perfumes; microsponges, with or without added chemicals for functionality purposes; odor absorbing, inhibiting and masking particles such as activated carbon and perfumes (e.g. anisyl alcohol, benzophanone, musk and ABSCENTS.TM. odor absorbing sieves mentioned above); fungicides (which may be broadly considered as an antimicrobial), such as misonazole nitrate and CAPTAN.TM. (trichloromethythio-dicarboximides), etc.; electromagnetic absorbers/deadeners (e.g. Fe, Pb, Al, Ag, Au); flame enhancers, such as powdered magnesium; magnetizing particulate materials, such as iron oxides; heat release particles, such as PEG-1000 (polyethylene glycol) which may be used in handwarmers and which crystalize at room temperature; radioactive particle tracers or labels, such as Carbon 14 (which may for example be combined in a bandage to trace absorption of antimicrobials from the bandage into a user's body), sodium iodide, uranyl nitrate, thorium nitrate, etc., starch particles such as cationic size press starch, which can be a binder when wet and can serve as a biodegradable adhesive; granular polymer particulate materials, such as recycled thermoset or thermoplastic polymer particles, which may, for example, be used as a filler when attached to fibers; catalysts, such as finely divided platinum; radar reflective particles, such as metallic powders; radar absorbing particles, such as graphite and ferrites; sound deadening or absorbing particles, such as barium sulfate; antistatic particles, such as sulfonated polyaniline and electrically conductive particles (e.g. metal powders); hot melt adhesives, such as ethylene vinyl acetate (these particles may have either higher or lower melting points than heat fusable or curable binders if used to attach the particles to fibers); bulking agents, such as expanded or unexpanded microspheres, ground foams, hi-bulk silicas, etc.; lubricating (antifriction) particulates such as graphite and TEFLON.TM. PTFE particles; friction inducing particulates, such as rubber; powdered soaps, surfactants and degreasers, such as laundry detergent (e.g. sodium dodecyl sulfate); chitosan particles; pollutant filtering particles, such as polyethyleneimine as a powder or a particulate for formaldehyde filtering; sorbants, such as diatomaceous earth; a coagulant or blood clotting agents (such as incorporated into bandages) with calcium nitrate being one example; indicators, such as for indicating the presense of chemicals (e.g. phenolphthalein/bromothymol blue) and water (e.g. cobalt chloride); anesthetic or pain killing particles (such as incorporated into dressings) with acetaminophen and codeine being specific examples; dissicants, such as calcium sulfate; medicines and pharmaceuticals, such as cortisone (anti-inflammatory), DRAMAMINE.TM., medication particles, nitroglycerine; chemical neutralizing particles, such as potassium permanganate for neutralizing formaldehyde; oxidizing agents, such as potassium permanganate; reducing agents, such as aluminum; fabric softeners, such as quaternary ammonium salts and cationic surfactants; nutrient particles, such as vitamins, with ascorbic acid being a specific example of such particles (which would also function as a food preservative); and blood anti-coagulants, such as heparin. Thus, the solid particulate materials are not limited to narrow categories. Furthermore, one or more of the above particles may be mixed as required. When mixed, multiple types of particles may be adhered to the same fibers. Alternatively, blends of fibers, each with one or more particle types may be used. Also, the specific examples listed in the categories identified above are by no means exhaustive nor are the identified particulate categories intended to be limiting. These fibers with attached particulate materials may be included in absorbent and other structures, such as filters and rigid structures, and may or may not be blended with other fibers (including wood pulp fibers) in such structures.

Detailed Description Text (86):
The tensile index of the blend was 0.3 N-m/g at a 0.06 g/cc density. PRIMACOR binder is a hydrophobic, somewhat oleophilic thermoplastic binder. Therefore, a PRIMACOR binder coated fiber is capable of absorbing oil and excluding water.

Detailed Description Text (141):
Thus, a binder such as PRIMACOR binder may be used with hexanol as a surfactant as explained in connection with example 1 as a hydrophobic binder. As another example, PMDI may be used as a hydrophobic binder (see example 3). While PRIMACOR and PMDI binders have a tendency to absorb oil to a limited extent, they are not optimum oil absorbing materials. By attaching polynorbornene particles to the fibers, fibers having an enhanced capacity for oil absorption may be produced as the polynorbornene in effect acts like a super absorbent for oil.

Detailed Description Text (153):
This example demonstrates the enhanced oil absorbency characteristics of binder coated fibers with another type of attached oil absorbing particulate materials, in this case a hydrophobic fumed silica material.

Detailed Description Text (154):
Specifically, 107 grams of southern bleached kraft (NB316, seven percent moisture) were placed in a recirculating duct including a fan or blower. The fan was turned on and the fluff became air entrained. Seventy-nine and six tenths grams of binder, in this case, AF4530 latex binder from Air Products, Inc. of Allentown, Pa. were sprayed onto the fluff through a port in the recirculating duct. After the latex was sprayed, the fan was turned off and ten grams of a hydrophobic fumed silica particulate material, in this case Aerosil R812 from Degussa, Inc. of Richfield Park, N.J. was added to the fibers. The fan was then restarted and the mixture circulated for one minute to ensure complete mixing. This yielded a mixture that was approximately thirty percent by weight binder, seven percent by weight silica, and sixty-three percent by weight fiber. The mixture was shunted into an air permeable nylon bag, collected and spread out on a bench overnight to air dry. A sample was then taken for testing for hydrophobicity and oleophilicity. The sample floated on water for one month (after which the test was stopped). When the material was placed in a layer of diesel oil (No. 3 diesel oil) over a layer of water, the material absorbed approximately 15 times its weight of the diesel oil almost instantaneously. In addition, the material remained in the oil layer overnight (after which the test was stopped). Therefore, surprisingly a hydrophilic material, namely wood pulp, when treated in this manner, floated for a substantial period of time and also was rendered highly oil absorbent. This fiber, as well as absorbent structures of this material, is therefore a candidate for spreading on oil spills and the like, in particular oil spills in bodies of water, for environmental clean-up purposes.

WEST

Generate Collection Print

L5: Entry 14 of 15 File: USPT Nov 12, 1991

DOCUMENT-IDENTIFIER: US 5064689 A
TITLE: Method of treating discontinuous fibers

Brief Summary Text (12):
U.S. Pat. No. 4,010,308 of Wiczer describes foamed porous coated fibers. Fibers, described as organic or inorganic fibers of any character, are described as being coated with a foamable plastic material. Thermoplastic and thermosetting coatings are mentioned. In several examples, the coated fibers are made by passing continuous extruded filaments through a first bath of a ten percent polystyrene solution in toluene, evaporating the solvent, and passing the polystyrene coated fiber through a second bath containing a blowing agent, such as liquid n-pentane. The treated filaments are then heated to foam the coating. Rolls are used to rub solid particles into the porous surface of the foam coating. Fireproofing agents, lubricants such as graphite, pigments, and insecticides are among the examples of solid materials mentioned as suitable for rubbing into the coating. In another example, short lengths of cotton linters are described as being wet with a ten percent solution of a copolymer of polystyrene and acrylonitrile in about equal proportions dissolved in benzene. The solvent is evaporated in an air stream and the resulting coated cotton fiber is dipped in mixed pentanes. The product is then stirred in boiling water to cause foaming. Following foaming, the product is centrifugally dried and again dried in an air stream. The fiber is then mixed with a dry powder to fill the pores in the foamed coating with the powder. The placement of this fiber product in a container and heating the product to cause the adherence of the fiber surface contact points is also mentioned. The Wiczer patent appears to use a solution dipping approach as a means of applying the coating to the fibers.

Detailed Description Text (2):
The method of the present invention is applicable to treating discontinuous synthetic and natural fibers. The term natural fibers refers to fibers which are naturally occuring, as opposed to synthetic fibers. Non-cellulosic natural fibers are included, with chopped silk fibers being one example. In addition, the term natural fibers includes cellulosic fibers such as wood pulp, bagasse, hemp, jute, rice, wheat, bamboo, corn, sisal, cotton, flax, kenaf, and the like and mixtures thereof. The term discontinuous fibers refers to fibers of a relatively short length in comparison to continuous fibers treated during an extrusion process used to produce such fibers. The term discontinuous fibers also includes fiber bundles. The term individual fibers refers to fibers that are comprised substantially of individual separated fibers with at most only a small amount of fiber bundles. Chopped or broken synthetic fibers also fall into the category of discontinuous fibers. Although not limited to any particular type of fiber, the synthetic fibers commonly are of polyethylene, polypropylene, acrylic, polyester, rayon and nylon. Discontinuous fibers of inorganic and organic materials, including cellulosic fibers are also included. The natural fibers may likewise be of a wide variety of materials, such as mentioned previously.

Detailed Description Text (44):
In addition, in accordance with the method, one or more solid particulate materials may be adhered to the fibers to provide desired functional characteristics. The solid particulate materials are applied to a binder wetted surface of the fibers and are then adhered to the fibers by the binder as the binder dries. In this case, heat curing or heat fusing of the binder is not required to adhere the particles to the fibers. Although not limited to specific materials, examples of suitable particulate

materials include pigments, such as titanium dioxide; fire retardant materials, such as alumina trihydrate and antimony oxide; electrically conductive materials, such as metallic powders and carbon black; abrasive materials, such as ceramics, grit and metallic powders; acidular materials, such as clay, talc and mica, used as papermaking additives; oleophilic materials; hydrophobic materials; and hydrophilic materials, such as super absorbent particles; insecticides; and fertilizers. Thus, the solid particulate materials are not limited to narrow categories.

Detailed Description Text (79):
In addition, the dried coated fiber obtained in this manner was blended with uncoated fiber in a ratio of 1/3 coated fibers to 2/3 uncoated NB-316 fibers. The blend was air laid and thermobonded. The tensile index of the blend was 0.3 N-m/g at a 0.06 g/cc density. Primacor is a hydrophobic, somewhat oleophilic thermoplastic binder. Therefore, a Primacor coated fiber is capable of absorbing oil without water.

Detailed Description Text (107):
Thus, a binder such as Primacor may be used with hexanol as a surfactant as explained in connection with example 1 as a hydrophobic binder. As another example, PMDI may be used as a hydrophobic binder (see Example 3). While Primacor and PMDI have a tendency to absorb oil to a limited extent, they are not optimum oil absorbing materials. By attaching polynorbornene particles to the fibers, fibers having an enhanced capacity for oil absorption may be produced as the polynorbornene in effect acts like a super absorbent for oil.

L5: Entry 15 of 15 File: USPT Oct 15, 1991

DOCUMENT-IDENTIFIER: US 5057166 A
TITLE: Method of treating discontinuous fibers

Brief Summary Text (12):
U.S. Pat. No. 4,010,308 of Wiczer describes foamed porous coated fibers. Fibers, described as organic or inorganic fibers of any character, are described as being coated with a foamable plastic material. Thermoplastic and thermosetting coatings are mentioned. In several examples, the coated fibers are made by passing continuous extruded filaments through a first bath of a ten percent polystyrene solution in toluene, evaporating the solvent, and passing the polystyrene coated fiber through a second bath containing a blowing agent, such as liquid n-pentane. The treated filaments are then heated to foam the coating. Rolls are used to rub solid particles into the porous surface of the foam coating. Fireproofing agents, lubricants such as graphite, pigments, and insecticides are among the examples of solid materials mentioned as suitable for rubbing into the coating. In another example, short lengths of cotton linters are described as being wet with a ten percent solution of a copolymer of polystyrene and acrylonitrile in about equal proportions dissolved in benzene. The solvent is evaporated in an air stream and the resulting coated cotton fiber is dipped in mixed pentanes. The product is then stirred in boiling water to cause foaming. Following foaming, the product is centrifugally dried and again dried in an air stream. The fiber is then mixed with a dry powder to fill the pores in the foamed coating with the powder. The placement of this fiber product in a container and heating the product to cause the adherence of the fiber surface contact points is also mentioned. The Wiczer patent appears to use a solution dipping approach as a means of applying the coating to the fibers.

Detailed Description Text (2):
The method of the present invention is applicable to treating discontinuous synthetic and natural fibers. The term natural fibers refers to fibers which are naturally occuring, as opposed to synthetic fibers. Non-cellulosic natural fibers are included, with chopped silk fibers being one example. In addition, the term natural fibers includes cellulosic fibers such as wood pulp, bagasse, hemp, jute, rice, wheat, bamboo, corn, sisal, cotton, flax, kenaf, and the like and mixtures thereof. The term discontinuous fibers refers to fibers of a relatively short length in comparison to continuous fibers treated during an extrusion process used to produce such fibers. The term discontinuous fibers also includes fiber bundles. The term individual fibers refers to fibers that are comprised substantially of individual separated fibers with at most only a small amount of fiber bundles. Chopped or broken synthetic fibers also fall into the category of discontinuous fibers. Although not limited to any particular type of fiber, the synthetic fibers commonly are of polyethylene, polypropylene, acrylic, polyester, rayon and nylon. Discontinuous fibers of inorganic and organic materials, including cellulosic fibers are also included. The natural fibers may likewise be of a wide variety of materials, such as mentioned previously.

Detailed Description Text (44):
In addition, in accordance with the method, one or more solid particulate materials may be adhered to the fibers to provide desired functional characteristics. The solid particulate materials are applied to a binder wetted surface of the fibers and are then adhered to the fibers by the binder as the binder dries. In this case, heat curing or heat fusing of the binder is not required to adhere the particles to the

fibers. Although not limited to specific materials, examples of suitable particulate materials include pigments, such as titanium dioxide; fire retardant materials, such as alumina trihydrate and antimony oxide; electrically conductive materials, such as metallic powders and carbon black; abrasive materials, such as ceramics, grit and metallic powders; acidular materials, such as clay, talc and mica, used as papermaking additives; oleophilic materials; hydrophobic materials; and hydrophilic materials, such as super absorbent particles; insecticides; and fertilizers. Thus, the solid particulate materials are not limited to narrow categories.

Detailed Description Text (79):
In addition, the dried coated fiber obtained in this manner was blended with uncoated fiber in a ratio of 1/3 coated fibers to 2/3 uncoated NB-316 fibers. The blend was air laid and thermobonded. The tensile index of the blend was 0.3 N-m/g at a 0.06 g/cc density. Primacor is a hydrophobic, somewhat oleophilic thermoplastic binder. Therefore, a Primacor coated fiber is capable of absorbing oil without water.

Detailed Description Text (107):
Thus, a binder such as Primacor may be used with hexanol as a surfactant as explained in connection with example 1 as a hydrophobic binder. As another example, PMDI may be used as a hydrophobic binder (see Example 3). While Primacor and PMDI have a tendency to absorb oil to a limited extent, they are not optimum oil absorbing materials. By attaching polynorbornene particles to the fibers, fibers having an enhanced capacity for oil absorption may be produced as the polynorbornene in effect acts like a super absorbent for oil.